

Rock Island Arsenal
Shop C Boiler House
(Building 105)
South Avenue between Gillespie Avenue
and Second Street, in Courtyard of
Shop C
Rock Island
Rock Island County
Illinois

HAER No. IL-20-K

HAER
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

HAER
ILL.
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ROCK ISLAND ARSENAL
SHOP C BOILER HOUSE
(Building 105)
HAER No. IL-20K

Location: South Avenue Between Gillespie Avenue and
Second Street in Courtyard of Shop C,
Rock Island Arsenal,
Rock Island,
Rock Island County, Illinois
UTM: 15.704830.4598860
Quad: Davenport East

Date of Construction: 1871-1872

Present Owner and Occupant: U.S. Army

Present Use: Administrative offices

Significance: After taking command of Rock Island Arsenal
in 1865, General Thomas Jefferson Rodman
devised a master plan for the installation
calling for the construction of ten large,
Greek Revival, manufacturing shops, five on
each side of the island's major east-west
thoroughfare. According to the original
plan, each shop was intended to have its own
boiler house, but only two such plants were
built. The Boiler House for Shop C was the
first, completed in 1872. It supplied steam
for power and heating throughout the
nineteenth century. With its companion
facilities completed under the Rodman plan,
Shop C Boiler House forms a cohesive
architectural statement, which, in terms of
both scale and style, has no counterpart
among government installations in the
Midwest.

In addition to their architectural
importance, the Rodman plan buildings are the
administrative and technological core of
Rock Island Arsenal, one of only two
"old-line," nineteenth-century arsenals
still in operation for munitions production.
The buildings are vital for understanding
the history of American ordnance development
and manufacture from the Spanish American

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War to the present. Shop C Boiler House is
part of the Rock Island Arsenal National
Register Historic District.

Historian:

Jeffrey A. Hess, February 1985

Architectural Historian:

David Arbogast, February 1985

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PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: Construction apparently commenced in 1871. A datestone on the building's south facade is inscribed in Roman numerals, "1871." According to Colonel Daniel Webster Flagler, who succeeded General Thomas Jefferaon Rodman as the arsenal's commandant in 1871, the building was constructed in 1872, and fully outfitted with machinery in 1873 (Flagler, p. 271).
2. Architect: Not known. Plans were prepared under the direction of Colonel Daniel Webster Flagler, who supervised the arsenal's construction program from 1871 to 1886 (Flagler, p. 123; Nothstein and Stephens, p. 605).
3. Original and subsequent owners: U.S. Army.
4. Builder, contractor, suppliers: Not known.
5. Original plans and construction: On February 7, 1866, Rodman submitted to the War Department a schematic site plan of the arsenal, proposing the construction of ten manufacturing shops, five on each side of the arsenal's main east-west thoroughfare (later named Rodman Avenue). The plan was published in 1877 (Flagler, Plate I). It delineates the ten shops as U-shaped buildings with a crossbar connecting the legs of the "U" at midpoint. According to Flagler, the structure connecting the two wings "was intended for a boiler house and steam engine room." But in revising the initial plan, Rodman decided "to build a boiler house in the [shop] court[yard], entirely separate from the shop [building]." This arrangement left "the court clear for teaming purposes, as it gives access to doors in all parts of the [shop]" (Flagler, p. 123)

Apparently, Rodman never prepared plans for the freestanding boiler house, and the first shop under construction, Shop B (see HAER No. IL-20A), was completed in 1871 without one. When Flagler succeeded Rodman as commandant in June 1871, Shop C (see HAER No. IL-20G) was nearing completion, and Flager supervised the construction of a companion boiler house. Original plans and elevations for Shop C Boiler House are on file at the Rock Island Arsenal Engineering Plans and Services Division (see HAER Photo Nos. IL-20K-5 through IL-20K-8). According to these drawings, the building was designed as a one-story, gable-roofed limestone structure connected by an underground flue to a free-standing brick smokestack with an ornate cap and limestone base. The

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smokestack was to be situated just south of the boiler house. A bird's-eye view of the arsenal published in 1877 depicts the building's smokestack, but gives no other details of construction (Flagler, frontispiece). The building's present configuration conforms to the original plan, with two exceptions. First, the ornate cap has been removed from the smokestack. Second, the smokestack is now connected to the Boiler House by a one-story, shed-roofed, reinforced-concrete structure.

6. Alterations and additions: By 1918, a one-story, shed-roofed, reinforced-concrete structure had been constructed, joining the smokestack to the Boiler House. The addition was surmounted by a cyclone separator connected by metal tubing to woodworking machines in Shop C (see HAER No. 1L-20G). The separator fed wood refuse into the boilers ("General Course," p. 94). The picture collection of the Rock Island Arsenal Historical Office has a 1944 photograph showing the addition with the cyclone separator (see HAER Photo No. 1L-20K-4). At an undetermined date after 1944, the separator was dismantled.

About 1956, the ornate cap was removed from the smokestack. The Rock Island Engineering Plans and Services Division has a plan for this alteration, labeled, "Building 105 / Removal of Damaged Section and Re-cap of Chimney," June 22, 1956, R1A B105-A5.

B. Historical Context:

After assuming command of Rock Island Arsenal in August 1865, General Thomas Jefferson Rodman devised a master construction plan for the installation, which he submitted to the War Department on February 7, 1866. Rodman's plan called for the construction of ten large, stone, manufacturing shops, five on each side of the arsenal's main east-west thoroughfare (later named Rodman Avenue). Each of the shops was to have its own connecting boiler house. In a revision of the plan, the boiler houses were made freestanding structures situated at the rear of the shops. Constructed in 1871-1872, Shop C Boiler House was the only such structure completed during the nineteenth century (a different boiler house design was employed for Shop F in 1879, see HAER No. 1L-20C).

In 1872-1873, the Boiler House was outfitted with four steam boilers and a 125-horsepower Corliss steam engine procured from Springfield Armory in Massachusetts (Flagler, pp. 271, 335). The steam engine was connected by belting and shafting to woodworking and machining equipment in Shop C. It remained in service at least until 1913, supplementing a telodynamic waterpower system installed in 1879, and later a hydroelectric power system that went on line in 1901.

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("History of Rock Island Arsenal," pp. 73-74; see also HAER No. IL-20CC). In addition to providing power for Shop C, the Boiler House furnished steam for comfort heating, partially fueling its boilers with wood refuse from the shop's woodworking operation. After the construction of a central steam heating plant for the arsenal in 1918, the Boiler House was primarily used as an incinerator (Completion Report, p. 3; "General Course," pp. 94-95). It continues in that capacity to the present time. The Boiler House has been designated as "Building 105" at least since World War II (see HAER Photo No. IL-20K-4; for additional documentation, see HAER No. IL-20).

Prepared by: Jeffrey A. Hess
 MacDonald and Mack Partnership
 February 1985

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The building is composed of four primary segments - the chimney (HAER Photo Nos. IL-20K-1 and IL-20K-3), the addition, the main building (HAER Photo No. IL-20K-2), and the overhead bridge. The chimney, at the south end of the complex, is a tall, tan brick shaft on a limestone base. The main building is a rectangular-plan, Greek Revival style, one-story building. The addition connects the chimney with the main building. The overhead, wooden bridge connects the main building with the first floor of the south elevation of the main block of Building 104, an administration building, to the north. The only complete boiler house constructed, its chimney is similar to that of Building 65, of the same period, in the courtyard of Building 64.
2. Condition of fabric: The building has been abandoned and is in fair condition.

B. Description of Exterior:

1. Overall dimensions: The main building (HAER Photo No. IL-20K-2) measures 24' (3 bays on the south and 1 bay on the north) x 56' (6 bays) and is one story in height without basement or attic. The chimney (HAER Photo Nos. IL-20K-1 and IL-20K-3) is 15' (1 bay) x 15' (1 bay) at its base. The addition (HAER Photo Nos. IL-20K-1, IL-20K-2, and IL-20K-3) measures 24' x 15' between the main building and the chimney. The bridge (HAER Photo No. IL-20K-2) is 10' in width.

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2. Foundations: Coursed, rock-faced ashlar limestone below dressed ashlar limestone water tables in the main building and the chimney. The addition has poured concrete foundations.
3. Walls: The main building (HAER Photo No. IL-20K-2) has coursed, rock-faced ashlar limestone walls. Colossal rock-faced ashlar limestone pilasters rising from the water table to a full, Classical entablature divide the east and west elevations into a regular bay system. The dressed limestone entablature carries a projecting dressed limestone cornice. The north wall is merely rock-faced ashlar limestone. The original south exterior wall is now contained behind the addition and is discussed as an interior wall.

The chimney (HAER Photo Nos. IL-20K-1 and IL-20K-3) has rock-faced limestone ashlar base walls. The base walls are exposed on the south, east, and west elevations and connected to the addition on the north. They have dressed limestone flat pilasters with caps at each corner above the water table and below a full entablature. Centered on the three exposed sides are arch openings with rock-faced jambs, the water table as their base and radiating rock-faced voussoirs with a rock-faced keystone. The arches are filled with rock-faced limestone ashlar as their original construction. Above the south arch is a dressed limestone block carved in block lettering with, "A.D. MDCCCLXXI". At each side of each arch in the water table are single small openings with straight sides and triangular tops.

The addition (HAER Photo Nos. IL-20K-1, IL-20K-2, and IL-20K-3) has massive, poured-concrete lower walls and frame upper walls covered with corrugated steel siding.

The bridge (HAER Photo No. IL-20K-2) walls are clad with standard vertical board siding painted tan.

4. Structural systems: The main building (HAER Photo No. IL-20K-2) has limestone bearing walls, a poured concrete floor, and a roof system supported by iron Fink trusses. The chimney (HAER Photo Nos. IL-20K-1 and IL-20K-3) has limestone and brick bearing walls. The addition (HAER Photo Nos. IL-20K-1, IL-20K-2, and IL-20K-3) has lower concrete bearing walls and upper frame walls, a poured concrete floor, and a frame roofing system. The bridge (HAER Photo No. IL-20K-2) has wood frame wall, floor, and roof systems.
5. Chimneys: The main chimney (HAER Photo Nos. IL-20K-1 and IL-20K-3) is a square, tan brick stack rising from the limestone base described above. The chimney stack tapers gradually as it ascends. Each of its four faces has a single panel. The original chimney cap has been removed and the chimney stack shortened. In the roof

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of the main building (HAER Photo No. IL-20K-2) are a number of non-original round metal flues and vents.

6. Openings:

- a. Doorways: In the north bays and the second bays from the south of both the east and west elevations of the main building (HAER Photo No. IL-20K-2) are pedestrian doorways having flat, cut limestone lintels, ashlar limestone jambs and concrete sills and now containing a variety of heavily deteriorated non-original doors.

In the addition (HAER Photo No. IL-20K-1), there is a large rectangular concrete doorway opening in the south wall west of the chimney. It is missing its original doors.

- b. Windows: The main building (HAER Photo No. IL-20K-2) has single window openings in the first, third, fourth, and sixth bays from the south of the east and west elevations (i.e. all bays not having doorways). These openings have rock-faced limestone jambs and flat, dressed limestone lintel and sill blocks and are filled with rock-faced ashlar limestone, apparently as part of their original construction.

In the south wall of the addition (HAER Photo Nos. IL-20K-1 and IL-20K-3), east of the chimney and in the east wall are horizontal window openings now missing their sash, having plywood infill. In the west face of the upper, frame portion of the addition is a heavily deteriorated four-light, fixed, wood window sash.

In each side of the bridge (HAER Photo No. IL-20K-2) are two simple, rectangular, window openings now missing their sash, having plywood in their place.

7. Roof:

- a. Shape, covering: The main building (HAER Photo No. IL-20K-2) has a gable roof with a ridge running north-south and is covered with corrugated iron. The addition (HAER Photo Nos. IL-20K-1, IL-20K-2, and IL-20K-3) has a shed roof on its lower section sloping to the south and an upper, bowed roof to the north. Both are clad with corrugated steel. The bridge has a low, gable roof with a north-south ridge and is covered with asphalt shingles.
- b. Cornice, eaves: The main building (HAER Photo No. IL-20K-2) has cut limestone cornices and eaves. The bridge (HAER Photo No. IL-20K-2) has minimal wood eaves with no gutters.

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C. Description of Interior:

1. Floor plans: The main building has a large, single room with a set of boilers filling the north end. The chimney, addition, and bridge are all single-room structures.
2. Stairways: A steel walkway runs along the top of the south side of the boilers in the main building and is reached by a straight-run stair at the west end with a pipe railing at the stair and walkway sides.
3. Flooring: The main building, chimney, and addition all have concrete floors. The bridge has a wood floor.
4. Wall and ceiling finishes: The main building has rock-faced limestone walls. Its ceiling is the open, corrugated iron roofing. The north base wall of the chimney (originally an exterior wall) has limestone pilasters, entablature, arch, and vent openings matching those of the east and west base walls. The stack walls are tan brick. The lower walls of the addition are concrete and the upper walls and ceiling are exposed framing with the corrugated steel of the exterior exposed. The bridge walls and ceiling are wood.
5. Openings:
 - a. Doorways and doors: At the floor level of the south wall (originally an exterior wall) of the main building are three, large, semi-circular arched openings with rock-faced voussoirs, keystones, and jambs. The east and west openings were constructed for doorways and extend to the floor having large, semi-circular, base blocks projecting into their openings. The east opening is filled with structural clay tile and the west opening has a large pair of steel slab doors with structural clay tile above.
 - b. Windows: The east and west window openings of the main building are filled with brick. The center opening of the lower south wall has a large, semi-circular arch with rock-faced limestone voussoirs, keystone, and jambs extending to a rock-faced sill block and is filled with structural clay tile. Centered in the gable end above it is a similar, smaller, window opening now also filled with structural clay tile. The addition window openings have no casings or trim.
6. Mechanical equipment:
 - a. Heating, air conditioning, ventilation: No longer used, the boilers provided heat for the building. There are no air

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conditioning or ventilation systems.

- b. Lighting: Artificial lighting is by means of incandescent electrical fixtures. No evidence remains of original artificial lighting systems.
- c. Plumbing: The original plumbing system of the boilers survives intact.
- d. Mechanical equipment: Filling the north end of the main building is a set of four, large, cast-iron boilers.

D. Site:

- 1. General setting and orientation: The building is set in the courtyard of Building 104, an administration building and is surrounded on its north, east, and west sides by that building. To the south runs South Avenue. The courtyard is paved and is level.

Prepared by: David Arbogast
Architectural Conservator
February 1985

PART III. SOURCES OF INFORMATION

A. Original Architectural Drawings:

The Rock Island Arsenal Engineering Plans and Services Division has the following original drawings:

"Plan & Section Through Boiler House / Shop C," August 24, 1871, RIA B105-B2, D40169B (see HAER Photo No. IL-20K-8). Shows original construction.

"Plan of Roof for Boiler House of Shop C," 1871, RIA B105-A2, D40169C. Shows original construction (see HAER Photo No. IL-20K-7).

"Plan of Boiler House at Rock Island Arsenal," N.d., RIA B105-A1, D40169A (see HAER Photo No. IL-20K-5). Shows original construction.

"Front & Side Elevations of Boiler House at Rock Island Arsenal," September 15, 1871, RIA B105-B1, D40169 (see HAER Photo No. IL-20K-6). Shows original construction.

"Building 105 / Removal of Damaged Section and Re-cap of Chimney," June 22, 1956, RIA B105-A5. Shows removal of original chimney cap.

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B. Early Views:

A bird's-eye view of the arsenal published in 1877 depicts the building's smokestack (Flagler, frontispiece). The earliest known view showing the building's elevations is a 1944 photograph in the picture collection of the Rock Island Arsenal Historical Office. It is captioned, "72 / Looking North at Boiler House 'C,' Bldg. No. 105 / 11 November 1944" (see HAER Photo No. IL-20K-4). The photograph shows the cyclone separator.

C. Bibliography:

1. Primary and unpublished sources:

"General Course of Instruction for Officers Assigned to Rock Island Arsenal," Rock Island, 1918. Rock Island Arsenal Historical Office. Discusses building's use as an incinerator and heating plant.

Hess, Jeffrey A., and Mack, Robert C. "Historic Properties Report Rock Island Arsenal, Rock Island, Illinois". Prepared by MacDonald and Mack Partnership, and Building Technology Incorporated for the Historic American Buildings Survey/Historic American Engineering Record, National Park Service, U.S. Department of the Interior, 1985. The report, with accompanying inventory cards, is filed as field records in the Prints and Photographs Division, Library of Congress, under HAER No. IL-20.

"History of Rock Island Arsenal Called for by O.O. 25301-D-195." N.d. Rock Island Arsenal Historical Office. Describes building's machinery and use to 1913.

Real Property Cards, Engineering Plans and Services Division, Rock Island Arsenal. Briefly describes building's structural characteristics and provides sketchy history of maintenance operations.

2. Secondary and published sources:

Completion Report Covering All Construction Projects Accomplished Under Supervision of the Construction Division, U.S. Army at Rock Island Arsenal. Rock Island Arsenal, 1919. Rock Island Arsenal Historical Office. Notes construction of the arsenal's central heating plant in 1918.

Flagler, Daniel Webster. A History of the Rock Island Arsenal from Its Establishment in 1863 to December 1876.

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Washington, D.C.: Government Printing Office, 1877. The most detailed account of the building's construction, written by the arsenal's commandant from 1871 to 1886.

Nothstein, Ira O. and Stephens, Clifford W. A History of Rock Island Arsenal from Earliest Times to 1954. Rock Island: U.S. Army, Rock Island Arsenal, 1965. 3 vols. Rock Island Arsenal. The best account of the arsenal's general operations.

D. Likely Sources Not Yet Investigated:

Record Group 156 at the National Archives contains correspondence on the construction and operation of Rock Island Arsenal from 1871 to 1903. This material is also available on 216 reels of microfilm at the Browning Museum, Rock Island Arsenal.

PART IV. PROJECT INFORMATION

This project was part of a program initiated through a memorandum of agreement between the National Park Service and the U.S. Department of the Army. Stanley J. Fried, Chief, Real Estate Branch of Headquarters DARCOM, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record, were program directors. Sally Kress Tompkins of HABS/HAER was program manager, and Robie S. Lange of HABS/HAER was project manager. Building Technology Incorporated, Silver Spring, Maryland, under the direction of William A. Brenner, acted as primary contractor, and MacDonald and Mack Partnership, Minneapolis, was a major subcontractor. The project included a survey of historic properties at Rock Island Arsenal, as well as preparation of an historic properties report and HABS/HAER documentation for 38 buildings. The survey, report, and documentation were completed by Jeffrey A. Hess, historian, Minneapolis; Barbara E. Hightower, historian, Minneapolis; David Arbogast, architectural historian, Iowa City, Iowa; and Robert C. Mack, architect, Minneapolis. The photographs were taken by Robert A. Ryan, J Ceronie, and Bruce A. Harms of Dennett, Muessig, Ryan, and Associates, Ltd., Iowa City, Iowa. Drawings were produced by John Palmer Low, Minneapolis.